

iSelect Video

Cross-Reference to Related Applications

5 The present invention is based upon and claims priority from U.S. Provisional Application serial number 60/227,890, filed August 25, 2000 entitled "iSelect Video" by Steven Peliotis, and U.S. Provisional Application serial number 60/227,916, filed August 25, 2000 entitled "Personalized Remote Control" by Thomas Huber.

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Background of the Invention

A. Field of Invention

15 The present invention generally pertains to video broadcast and more specifically, methods of automatically selecting or restricting various types of video broadcast.

B. Description of the Background

20 Often, news broadcasts may include news stories that the viewer may not want to see. Similarly, other types of video may include adult programming, violence, and other types of content that is not desired to be viewed by the viewer. On the other hand, the viewer may wish to focus on certain news broadcasts or other video content relating to specific subjects. For example, a viewer may wish to select video segments from news broadcasts relating to financial news on particular stocks that are held by the viewer. 25 Currently, viewers are compelled to accept whatever news stories are broadcast on a news channel or otherwise switch to another news channel.

30 There is therefore a need to provide viewers with the ability to select video segments based on content including content rating for both live and prerecorded broadcasts.

Summary of the Invention

The present invention overcomes the disadvantages and limitations of the prior art by
5 providing a system which will allow a user to select preferences to either select or exclude video
segments based upon content to the video segment.

The present invention may therefore comprise a method of selecting and excluding video
segments in a video stream to be viewed by a viewer comprising: placing markers in the video
10 stream that indicate the position of a division between the video segments of the video stream;
placing tags in the video stream that indicate content of each video stream; using video
preference information of the viewer to select and exclude video segments by comparing the tags
with the video preference information of the viewer; inserting alternate video segments that
replace video segments that have been excluded by the viewer.
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The present invention may therefore comprise a system for selecting and excluding video
segments in a video stream to be viewed by a viewer comprising: an encoder that encodes the
video stream with tags and markers to generate an encoded video stream; a set-top box that
receives the encoded video stream and separates the tags and the markers from the encoded
video stream to generate an un-encoded video stream; a video database, coupled to the set-top
20 box, that stores the un-encoded video stream and generates a selected video stream; a
comparator, coupled to the set-top box, that receives the tags and the markers and viewer
preferences and compares the tags with the viewer preferences to generate pointers, that point to
locations of video segments in the video database, and that select and exclude the video segments
from the video database to generate the selected video stream.

Brief Description of the Drawings

Figure 1 is a block diagram that indicates the manner in which encoded video is generated.

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Figure 2 is a schematic block diagram illustrating customer (user or viewer) hardware that can be used in accordance with one embodiment for implementing the present invention.

10 Figure 3 is a schematic block diagram illustrating another manner of implementing the present invention.

Figure 4 is a schematic block diagram illustrating the manner in which video is selected in accordance with Figure 3.

15 Figure 5 is a schematic block diagram of the video segment database.

Figure 6 is a schematic block diagram of a studio that generates live analog video and alternate video to be sent to a cable head-end.

20 Figure 7 is a schematic block diagram of a cable head-end and user system that receive live analog video from the head-end in accordance with the present invention.

Figure 8 is a schematic flow diagram of the operation of the device of Figure 7.

25 Figure 9 is a schematic block diagram of a system that uses delayed video.

Figure 10 is a flow diagram of the device of Figure 9.

Detailed Description of the Invention

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Figure 1 discloses the manner in which video 10 can be encoded by a content supplier or head-end 11 to generate encoded video 12. As shown in Figure 1, a vertical blanking encoder 14 is used to encode the video 10 with markers 18 and tags 22. Marker generator 16 generates markers that mark the beginning/end of each video segment. For example, in a news broadcast a 5 video segment may pertain to a particular news story such as the crash of the Concorde jet airliner or the crash of the Russian submarine. Each of these news stories is set off by a marker to mark the end of a video segment and the beginning of the next video segment. These markers may be entered manually by the content supplier or at the head-end. Similarly, various methods of automatically inserting markers can be used such as determining sound levels, brightness or 10 intensity readings from video, and other such methods. Of course, any desired method can be used for generating markers. Marker generator 16 can also generate markers 18 that can be inserted in various portions of a movie to identify video segments relating to violence, sex, adult language, and other types of content information that may relate to video preferences of the user. Again, these markers can be generated based upon information in the video segment such as 15 flesh tone, voice recognition, or similar processes. Of course, these markers can also be generated manually by the content provider.

As also shown in Figure 1, tag generator 20 generates tags 22 that are applied to the vertical blanking interval (VBI) encoder 14. Tags 22 provide information relating to the content 20 of the video segment. For example, a news segment may be identified as "Concorde crash" or "Russian Submarine," etc. The tags also may identify the rating of the video segment including rating information pertaining to adult content, adult language, violence, and other rating information. In addition, certain key words may be used as the tag generator such as murder, kill, shoot, or rape to exclude certain video segments. On the other hand, other key words such 25 as stock market, Wall Street, Dow Jones, Nasdaq, interest rate, Greenspan, Cubs, White Sox, Redskins, Broncos, Avalanche, etc. can be used to select certain video segments. The tag generator 20 may obtain information from the electronic programming guide (EPG). Further, the EPG may be implemented for each video segment and include rating information plus identifiers 30 in the form of key words for each video segment. The EPG can then be inserted in the video blanking interval in this fashion.

The vertical blanking interval (VBI) encoder 14 of Figure 1 inserts the markers 18 and tags 22 in the vertical blanking interval that occurs during the vertical retrace. The markers 18 and tags 22 can be encoded as either analog or digital data in the video stream 10 to generate the encoded video stream 12.

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Figure 2 is a schematic block diagram of customer (user) hardware 24 that can be used in accordance with one embodiment of the present invention with encoded video to allow selection or exclusion (de-selection) of video segments. As shown in Figure 2, the encoded video 12 is received by the set-top box 26 at the user's premises. The set-top box includes a vertical blanking interval decoder which is built into the set-top box 26 and is capable of separating the markers and tags from the video stream. The markers and tags are separated by the built-in vertical blanking interval decoder and sent to a filter/comparator 30 by way of connector 28. The unencoded video 32 is then sent to a video database storage device 34. User preferences 36 are entered by the user into the filter comparator 30 that contains storage for storing the user preferences. As indicated above, the user preferences can be in the form of key words or rating information. The filter comparator 30 compares the user preferences with the tags and determines a particular pointer for selected video segments. The pointer 38 is then sent to the video database storage device 34. The pointer 38 is used to select a video segment from the video database storage 34. The video database storage device 34 then transmits the selected video 40 to the user's TV 42 for display. In this fashion, selected video segments can be viewed in a slightly delayed but nearly real time fashion. The system of Figure 2 can also be used to exclude video segments by allowing the video database storage device 32 to transmit all of the video segments except those that have been excluded or de-selected using the pointers 38.

Figure 3 is a schematic diagram of another implementation of the present invention. As shown in Figure 3, the head-end 44 provides the aggregate content video over cable 46 to the customer (user) hardware 48 located at the user's site. The user may have a personal video recorder filter device 50 that is connected to the cable input 46 that selects certain video from the aggregate content video for recording based upon the user's habits and preferences. The personal video recorder filter may, for example, be a system such as that provided by Tivo, Inc., of Alviso, California, that is capable of storing numerous hours of video feed and is also capable

of selecting channels and times for particular broadcasts. For example, the Tivo system may be trained to select all financial news broadcasts that are viewed by the user on particular channels at particular times. In this fashion, financial news broadcasts can be recorded by the personal video recorder filter from the aggregate content provided over the cable 46 for later downloading
5 by the user.

Referring again to Figure 3, the video data that is provided by the personal video recorder filter 50 is passed to a video blanking interval decoder 52 that strips off the tags 54 and markers 56 from the video stream and provides an unencoded video stream 58. The unencoded video stream 58 is then stored in a video storage device 60. The tags and markers 56 are applied to a video segment database 62 that generates a video pointer table 64 (Figure 5). As explained below, the video pointer table 64 identifies the address at which the particular video segment is stored in the video storage 60. The video segment database 62 generates the table that is shown in Figure 5. The tag information 54, which forms part of the table shown in Figure 5, is compared in a filter comparator 64 with user preferences 70 that are generated by an input device 68. The comparison data 66 is then sent back to the video segment database 62 and stored in the video pointer table 69 illustrated in Figure 5. The data from the video pointer table 69 is then sequentially read according to the pointer number, and the information is transferred via connector 72 to the video storage 60. Video segments identified in the video pointer table 69 as being video that is OK to view are then read from the video storage device 60. The output of video storage device 60 consists of the video segments that have been authorized to be viewed by the viewer. These video segments are applied to the TV 74 for viewing by the viewer.
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Figure 4 is a more detailed block diagram illustrating the manner in which video segments are selected in accordance with Figure 3. As illustrated in Figure 4, the user activates an input device 68 that can comprise any desired type of input device such as a remote control, a keyboard, a voice recognition circuit, or other device for generating user preference data 70. The user preference data 70 is transferred to a user preference database 76 that comprises a portion of the filter/comparator 64 (Figure 3). The user preference data 70 is then applied to comparator 78 which is compared with the tags 54 to generate comparison data 66 that indicates whether the video segment is OK or not OK to view. This data is then sent to the video segment database 62
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where it is stored in the video pointer table 69 (Figure 5). The video pointer table 69 is then read sequentially from the video segment database 62. Video segment addresses 72 correspond to video that is OK to be viewed or sent via connector 72 to the video storage 60. Video storage 60 sequentially reads the video segments at the indicated video segment addresses to generate a
5 sequential series of selected video segments 80.

Figure 5 illustrates the video pointer table 69 that is stored in the video segment database 62. As shown in Figure 5, the video pointer table 69 includes a set of pointers, a start and end time for each video segment, one or more tags that are associated with the video segment, a
10 video pointer that indicates the address as to where the video is stored in a video storage device 60, and the comparison data indicating whether the video is OK to view. As indicated for the
pointer # 1, this video segment starts at time 0 and ends at 1 minute 45 seconds. This video
segment relates to the crash of the Concorde jet and is stored at address # 1 in the video storage
device 60. The comparison data 66 indicates that this video clip is not OK to view by the user.
15 This can occur either from favorable or unfavorable comparisons with the user preference data
depending on the system's selection preferences or exclusion preferences.

As also indicated in Figure 5, the viewer would like to view video clips regarding the
Russian submarine crash and the weather. The commercial video segment is indicated as a
20 mandatory video segment that cannot be excluded from the selected video segments 80 (Figure
4).

Figure 6 is a schematic block diagram of a studio 82 that is capable of generating both
regular broadcast video and alternate video feeds. Alternate video feeds can be used as substitute
25 video feeds if a particular video segment from the regular broadcast has been excluded (de-
selected) by the user. As shown in Figure 6, a controller 84 generates control signals that are
applied to switcher 86 to control the switcher 86. Switcher 86 selects one of a number of
different video feeds including feeds from studio cameras 88, 90, and 92, a video tape bank 94,
or a remote video feed 96 that has been received by a receiver 98 from a remote source. The
30 output of the switcher 86 is the broadcast video signal 100. The broadcast video signal 100 is
applied to a video blanking interval encoder 102 that encodes the broadcast video signal 100

with marker and tag information. Marker generator 104 generates the markers that indicate the beginning/end of each video segment. As indicated above, these may be generated manually in the studio or automated methods of generating markers may be used by the marker generator 104. Additionally, tag information is encoded on the broadcast video signal by the VBI encoder 102. Standard tag information such as "weather," "commercial," etc. is stored in the storage device 106 and applied to the VBI encoder for the appropriate video segment. Additionally, custom tag information 108 can be generated by computer 110 and applied to the VBI encoder 102. Custom tag information can be entered manually through the computer 110, or other means of generating the custom tag information can be used such as voice recognition and other methods disclosed above. The VBI encoder 102 then generates an encoded broadcast video signal 112 that is sent to the head-end. Switcher 86 can also generate an alternate video signal 114 that comprises an alternate selection of video that can be used to replace excluded video segments during a real time broadcast. The alternate video 114 is applied to a video blanking interval encoder 116 that is connected to a marker generator 104, a standard tag information generator 106, and computer 110 that generates custom tags information 108. The VBI encoder 116 generates an encoded alternate video signal 118 that is sent to the head-end.

Figure 7 illustrates the manner in which the encoded alternate video signal 118 and encoded broadcast video signal 112 are applied to the head-end and then transferred to the user's premises. As shown in Figure 7, the encoded alternate video signal 118 is applied to a video-on-demand system 120 that is operated by the head-end 122. The encoded broadcast video signal 112 is handled and processed in the same manner by the head-end as any standard broadcast signal. The cable system 124 delivers the encoded broadcast video signal 112 and the encoded alternate video signal 118 to the set-top box 128 at the user's premises. The encoded broadcast video signal 112 is applied to a video blanking interval decoder 126 that decodes the encoded broadcast video to separate the tag information 130 from the unencoded broadcast video 132. The tags are sent to a tag comparator 134 which compares the tag information with user preference data 136. The user preference data 126 is stored in a storage device 138 in the set-top box 128. The user can insert the user preference data 136 into the storage device by way of a user input 140 in the manner described above. The tag comparator 134 generates comparison data 142 that is applied to the filter/switch 144. The filter/switch uses the comparison data 142

to either select or de-select the unencoded broadcast video signal 132. If it is determined by the tag comparator 134 that the video segment should not be shown, a signal can be generated by the filter/switch 144 on back channel 146 to activate the video-on-demand system 120 to generate the encoded alternate video 118 that is applied to the filter/switch 144. The back channel can 5 comprise an asymmetric type system that uses standard telecommunications connections or can be connected back to the head-end 122 through the cable system. Alternately, the filter/switch can select a video slate from the alternate video slate storage device 148. The alternate video slate may comprise a slate such as a screen saver, commercial banner advertisement or other type of standard display. The output of the filter/switch 144 is the display video 150 that is applied to 10 the user's television 152 for display.

Figure 8 is a schematic flow diagram of the steps that are performed by the system of Figure 7. As shown in Figure 8, the user is watching TV at step 154. At step 156, the tag description information is retrieved from the encoded broadcast video by the video blanking 15 interval decoder 126. The tag information is then compared with the user preferences by the tag comparator 134 at step 158. The system then waits for the start marker (first marker) at step 160. A decision is then made at step 162 as to whether the video segment is to be skipped. If it is not, the video is viewed at step 164. A decision is then made at step 166 as to whether the marker is 20 the last marker. If it is the last marker, the process returns to step 154. If it was not the last marker, the process returns to step 164 and waits for the last marker.

Returning to step 162 of Figure 8, if it is determined that the video should be skipped a decision is made to go to step 168 to obtain the alternate video, such as the video-on-demand, a blank screen, or slate. If it is determined that a blank screen or a slate should be displayed, the 25 process proceeds to step 170 to show the blank screen or slate. A decision is then made at step 172 as to whether the latest marker is the last marker. If it is, the process returns to step 154. If it is not, the process returns to step 170 and continues to show the blank screen or slate. Returning to step 168, if it is determined to obtain the video-on-demand, the process proceeds to 30 step 174 to play the video-on-demand. It is then determined whether the end marker has been received at step 176. If it has not, the process returns to step 174. If the end marker has been received, the process returns to step 154.

The process steps illustrated in Figure 8 are one example of the manner in which this invention can be carried out. The processes described with regard to Figures 6 and 7 constitute alternative ways of carrying out the invention.

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Figure 9 is a schematic block diagram illustrating another method of implementing the present invention. Content supplier 180 supplies encoded video 181 to the head-end device 182. The encoded video 181 includes tags and markers that have been inserted in the video blanking interval by the content provider. The encoded video is sent to a video blanking interval decoder 184 at the head-end 182. The video blanking encoder 184 separates the video stream, which is sent to video storage 186, from the tags and markers 188, which are sent to the tags and markers storage device 190. The tags and markers storage device 190 stores the tags and markers 188 that have been separated from the encoded video signal. The user input 192 is used to generate user preferences that are applied by the user to the set-top box 194. The set-top box has a storage device 196 that stores the user preferences. The filter comparator 198 compares the tags with the user preference data and uses the markers to identify video segments that have been authorized to be viewed. This information is sent to the video storage device 186. Video storage device 186 reads the video segments that have been authorized from the data storage locations that have been identified from the output of the filter/comparator 198. The video storage device 186 therefore generates a delayed video stream 200 that is displayed on the TV 202. Figure 9 also illustrates the manner in which the system can be implemented in a manner that by-passes certain features of the present invention. For example, the undelayed video 204 can be sent from the head-end 182 directly to the customer's premises as it is conventionally done by the head-end 182. As shown in Figure 9, the undelayed video 204 is sent to set-top box 206 which displays the video on a TV 208.

Referring again to Figure 9, another method of operating the system can be implemented. The user can be allowed to sequentially view each of the video segments and use the user input device 192 to switch from one segment to another sequentially by skipping to the next marker. 30 These input control signals, that are supplied through the user input 192, instruct the video

storage device 186 to skip to the next marker and supply the TV 202 with the next video segment.

Figure 10 is a schematic flow diagram illustrating the process steps that can be carried out by the present invention. As shown in Figure 10, the process starts by obtaining the first marker and tag at step 210. At step 212, the tag is compared with the user preferences. If there is a favorable comparison, the video segment is played at step 214. It is then determined whether the last marker has been read at step 216. If there is an unfavorable comparison at step 212, the process skips directly to step 216. If this is the last marker, then the process stops at step 218. If it is not the last marker, the next marker and tag are retrieved at step 220. The process then returns to step 212.

The present invention therefore provides a system for viewing selected video segments and excluding video segments that do not correspond to user preferences. This allows the user to exclude certain video segments or select certain video segments from selected programming. The system can use rating information and tags that can be generated either manually or automatically. Further, the user can skip from one video segment to the next by implementing the system to skip to the next marker in response to a user input. All of these functions allow the user to maximize preferred content for a given video viewing segment.